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Prologue:

The *Feel Factory* is a powerful real-time MIDI signal processor. As intuitive to use as a mixer, except that the eight programmable faders not only control MIDI velocity, but also the relative timing of selected notes, note ranges and MIDI channels in real time. This revolutionary concept allows you to modify the output of your sequencer or drum machine and create a "feel" that enhances the kind of music you're making.

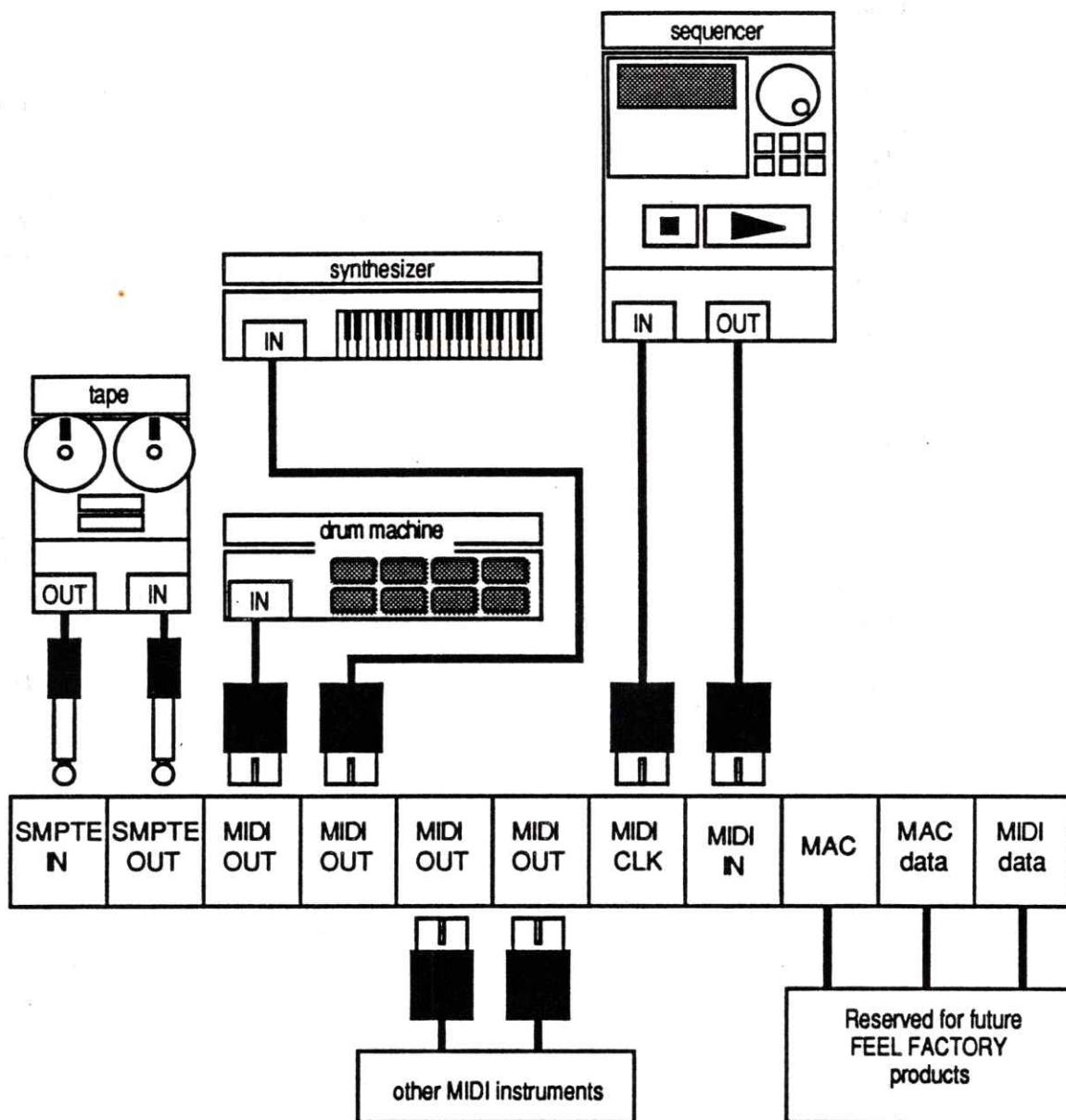
In addition, the *Feel Factory* can be an invaluable tool to solve MIDI delay and triggering problems. There are certain synthesizers that have wonderful sounds but "speak" quite late. A touch of a *Feel Factory* fader and this problem disappears. Triggering drums from tape can be a difficult task. Different drum samples speak differently plus many Trigger to MIDI devices have an 8-15 millisecond conversion delay. By recording the MIDI output of the trigger interface into a SMPTE synced sequencer and then processing the MIDI output through the *Feel Factory*, it is possible to make the drum sample speak even *before* the sound on tape! By closing your eyes and moving a fader, you can create results that would normally take hours.

Theory of Operation:

With a timing resolution much greater than that of most sequencers on the market, the *Feel Factory* reprocesses the incoming MIDI data stream in real-time and then sends it out to the sound generation units. The *Feel Factory* is also a SMPTE to MIDI converter so that syncing to tape and "feel factoring" your music at the same time can be done with this one unit. A question that is often asked is how the *Feel Factory* can move something ahead in time. How does it know what the sequencer will send it before it is sent? If you look in the section "SMPTE and the *Feel Factory*" it will give you a major clue.

Basic Connections:

The following diagram shows the possible connections that can be made to the *Feel Factory* back panel.



Hooking up your MIDI system is straight forward. The *Feel Factory* can be used with almost any MIDI sequencer via MIDI as shown in the above diagram. In addition, the *Feel Factory* contains built-in interfaces for future updates and upgrades.

MIDI connections: connection to MIDI devices use standard MIDI cables (5 pin DIN) and follow standard protocols, ie. "IN" to "OUT"

Note: If you are new to MIDI, or are not familiar with basic MIDI theory or procedure, it is suggested that you read your MIDI equipment manuals or consult one of the many introduction to MIDI books currently available.

MIDI sound generators such as synthesizers or drum machines can be connected to any of the four available OUTs on the *Feel Factory*. Channel assignments are made directly on the individual synthesizers or through your sequencer.

Sequencer connections: If you are using a dedicated MIDI sequencer, you will need to connect the sequencer OUT to the *Feel Factory* IN. The MIDI CLOCK connector on the *Feel Factory* should then be connected to the MIDI IN of your sequencer if you are using the *Feel Factory* as a SMPTE to MIDI converter.

Set the sequencer to "External Clock" when you wish to use the *Feel Factory* as a SMPTE to MIDI converter. Always make your sequencer or drum machines send MIDI clocks to enable the *Feel Algorithms* to operate correctly (or at all, Freddie.)

SMPTE connections: The *Feel Factory* can stripe a tape with longitudinal SMPTE. After tape has been striped, you can trigger the *Feel Factory* and your sequencer from tape. You will need at least one cable terminated on one end with a standard 1/4" phono jack and the other end terminated to fit the audio jacks of your tape/video machine.

To "stripe" a blank tape, connect the SMPTE OUT on the *Feel Factory* to the AUDIO IN of your tape (or video) recorder. See the section "USING SMPTE" elsewhere in this manual for how to set the *Feel Factory* to actually stripe the tape.

To "read" SMPTE from tape connect the AUDIO OUT of the tape machine to the SMPTE IN of the *Feel Factory*. See the section "USING SMPTE" elsewhere in this manual for how to set the *Feel Factory* to actually read and sync from the tape.

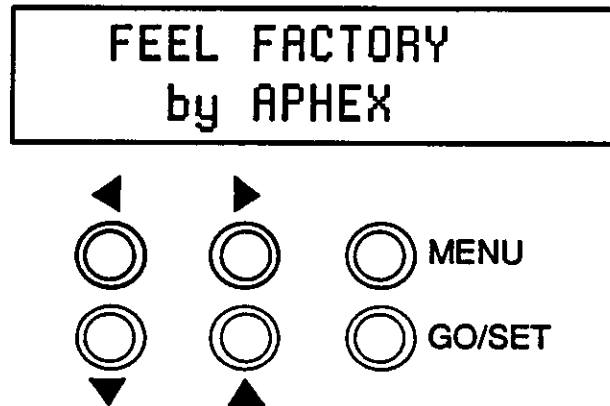
Basic Controls & Operation:

The *Feel Factory* is controlled from six pushbuttons and the eight faders on the top panel. Information on the status of the *Feel Factory* is provided by the Liquid Crystal Display (LCD) screen above the six pushbuttons. In addition, you will need to be familiar with the operation of your sequencer for starting and stopping of playback.

Introductory Exercises:

Power on & Opening screen:

Make sure the *Feel Factory* is properly connected to its power supply and the power supply is connected to an outlet. (We strongly suggest the use of a filtered power strip when using MIDI equipment.) Then turn on the *Feel Factory* by pushing in the power switch pushbutton on the top left corner of the unit. The Liquid Crystal Display should then light and display the opening screen:

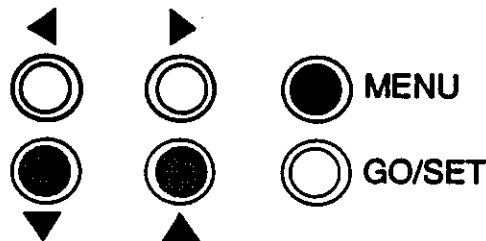


This is the opening screen of the *Feel Factory* and will always be present when power is first turned on to the unit. However, it will not appear again until you reset or cycle power to the unit.

The six buttons below the screen are for moving through the different screens of the unit and for setting parameters.

Moving Between Screens:

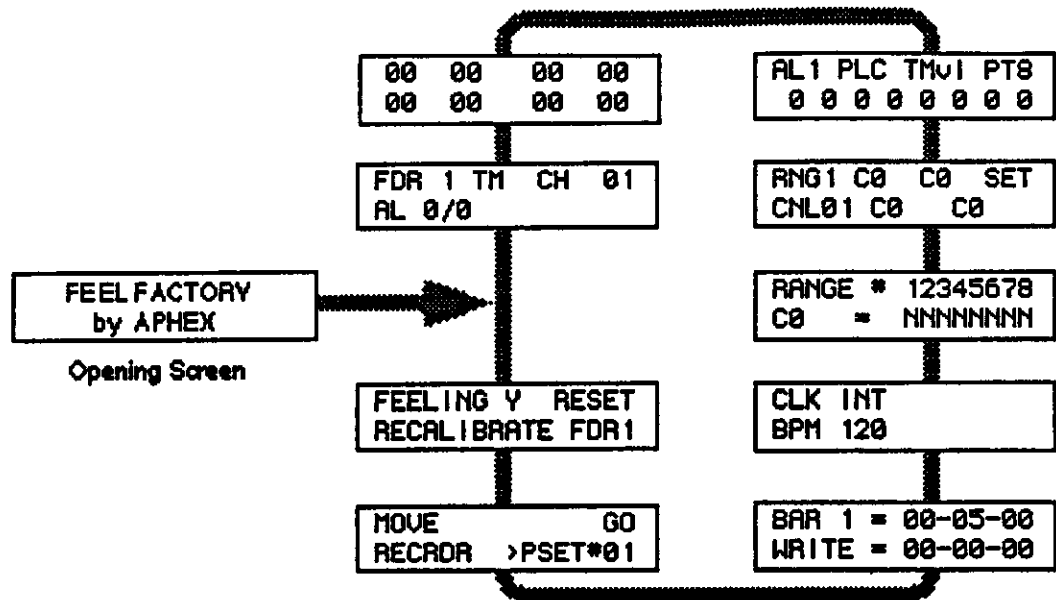
Push and hold the MENU BUTTON while clicking once on the DOWN BUTTON (indicated by the downward pointing triangle) button.



Hold DOWN on MENU button and click on either UP or DOWN button

You will see the screen contents change. If you click once again on the DOWN button while holding down the MENU BUTTON, you will see the screen change once again. Now if you hold down the MENU BUTTON once again while clicking this time on the UP BUTTON once, you will see the screen change again. Continue to hold down the MENU BUTTON while clicking on either the UP or DOWN BUTTON, and different screens will appear with each click.

The following diagram illustrates the main screens which are accessed by using the hold and click method just described:



The screens are arranged within the *Feel Factory* in a circular pattern as shown. Clicking on the UP key will bring up screens in clockwise succession, while clicking on the DOWN BUTTON will show the screens in counter-clockwise succession. The Opening Screen is displayed only at power up or reset, and consequently is not part of the circular pattern of the other screens.

Moving the cursor through individual screens:

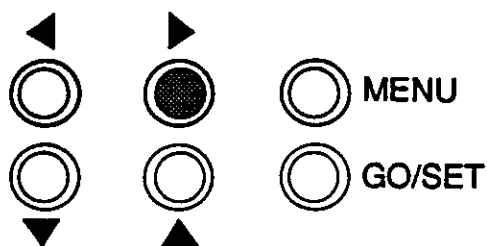
All the screens shown contain specific settings for the *Feel Factory*. These settings are accessed by using the LEFT and RIGHT arrow buttons. Go ahead and scroll through the different screens until you get the following screen:

```

FDR 1 TM CH 01
AL 0/0
  
```

You will notice that the number "1" corresponding to the number underlined above is flashing on the screen. This flashing is the cursor. As you move the cursor, other numbers or letters will begin to flash. For the purposes of this manual, an underlined item indicates the position of the flashing cursor.

You can now move the cursor to the next parameter by clicking once on the RIGHT arrow button as shown below (you do not have to hold the MENU BUTTON down when you are moving within a screen):



The position of the flashing cursor will now show as follows:

```

FDR 1  IM  CH  01
AL  0/0
  
```

As you click once again on the RIGHT arrow button, the flashing cursor will move again to the right. Repeated clicking will keep the cursor moving in the direction of the arrow button you are using. Once the cursor reaches the end of the screen, it will begin again at the other end of the screen.

Now click on the LEFT arrow button and the cursor will begin moving towards the left until it returns to its original position.

Try changing screens and moving the cursor around the other screens.

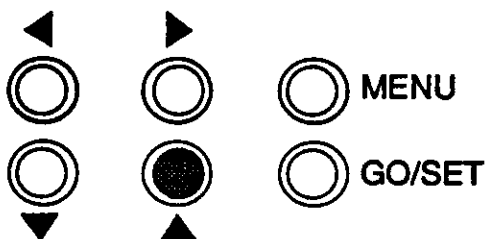
Changing parameter values:

Go back to the screen used in the previous exercise and position the cursor so it is on the original position as shown:

```

FDR  1  TM  CH  01
AL  0/0
  
```

Now click on the UP arrow button once (this time without depressing the MENU button):



After clicking once, the screen should now look like the following:

FDR	<u>2</u>	TM	CH	01
AL	0/0			

Note that the value at the cursor position has now incremented by a value of one. As you continue clicking on the UP arrow button, the value will keep changing until you reach "8" which is the maximum value for this parameter. Clicking on the DOWN arrow will decrement the value until you return to "1", after which continued clicking will not change the value further since it is now at the minimum value.

Move the cursor to the next value (TM) and press the UP arrow and the screen should now look like the following:

FDR	1	<u>VL</u>	CH	01
AL	0/0			

Notice that the previous value "TM" has now changed to "VL". This is the other effect of using the UP or DOWN arrow buttons, which can change parameter type in addition to parameter value. Of course, the *Feel Factory* will automatically limit the type of values that you can change via the UP or DOWN arrow keys.

A Faster Way to program the Feel Factory:

There is an alternative method to programming the *Feel Factory* without repeatedly clicking on the UP/DOWN BUTTONS to step through values and move between screens. This involves assigning one of the faders to function as an *alpha* or *data* controller (this feature is similar to the data fader on the Yamaha DX-7; you can use one of the faders to set specific values or to select between different choices on the display.)

Assigning a DATA Fader:

To use this feature, go to the Fader Assignment Screen as shown and move the cursor to the position indicated by the underline:

FDR	<u>1</u>	TM	CH	01
AL	0/0			

We will now select the fader that we will use as a DATA fader and in this example we will set it to be Fader #8. Use the UP/DOWN BUTTONS to select Fader #8 as shown:

FDR 8	TM	CH	01
AI	0/0		

Now that we have selected Fader #8, move the cursor over one position to the right by clicking once on the RIGHT BUTTON so the screen looks like this:

FDR 8	IM	CH	01
AI	0/0		

Now press either of the UP/DOWN BUTTONS until the word TM changes to DAT as shown below:

FDR 8	DAT	CH	01
AI	0/0		

The word DAT means that Fader #8 now functions as a DATA fader. But don't touch Fader #8 just yet (we'll explain why in just a second*), instead move the cursor back to the FDR# position with one click on the LEFT BUTTON:

Using the DATA Fader to set values:

FDR 8	DAT	CH	01
AI	0/0		

Now, try moving Fader #8 up and down as see what happens to the FDR#. You'll notice that to quickly go from one FDR# to another FDR# is now a lot easier than clicking on the UP/DOWN BUTTONS repeatedly.

You can now move the cursor to any other setting with the LEFT/RIGHT BUTTONS and experiment with how easily you can set different values.

Using the DATA Fader to move between screens:

Continuing with the above screen, this time move the cursor to the word FDR on the screen as if you were ready to move on to another screen:

FDR 8 DAT CH 01
A1 0/0

Normally you would change screens by clicking on both the MENU BUTTON and one of the UP/DOWN BUTTONS simultaneously. This time, press and hold down the MENU BUTTON and then slide Fader #8 up and down. The screens will now change as if you were clicking on the UP/DOWN BUTTONS -- except it's much faster now.

Tips on using the DATA Fader:

1) You can assign any fader to function as a DATA Fader. Once you have assigned a fader to function as a DATA Fader, it cannot be used for other functions.

We suggest that you assign the DATA Fader function to either Fader #1 or #8 depending on your preferences (right or left handed). When you need to use all eight faders, you should reassign the DATA Fader last so that you can use the DATA Fader when programming the other seven faders.

2) The DATA Fader feature is sensitive to how fast you move the fader. To move between large values (ie, between CHN #1 to CHN#16) move the fader slowly and smoothly. When you need to fine tune the fader (ie, CHN#4 to CHN#5) you can make a quick tap on the Fader. Or you can use the UP/DOWN BUTTONS -- they are still functional.

3) The range of values that a DATA Fader can select is sometimes limited by the amount of travel. For example, since there are 84 possible note values that can be selected in the Range Programming Screen, the fader cannot usually move far enough in the direction you want to give you the values you need. You can do two things:

a) If you have moved the fader to it maximum travel, you can quickly (very quickly) slide it back to the opposite direction, and then slowly move it back in the direction you want it to go. (If you have ever used a mouse on a computer, it's equivalent to picking up the mouse and moving it to another position so you can still move it in the direction you want it to go.) The main trick here is to move the fader very quickly when moving it back in the opposite direction. Experiment with this feature a few times and you will get the hang of it.

b) You can go to the Utility Screen and use the Recalibrate Fader function. This is covered in the Utility Screen section of this manual. This method is somewhat slower than the previous method.

***Why you should not use the DATA Fader on the fader you've just assigned.** Let's say you have just assigned Fader #1 as you DATA Fader and the cursor is still located at the location where you have just made the assignment:

FDR 1	DAT	CH	01
AI	0/0		

If you move the DATA Fader now, the assignment would immediately take effect and change the word DAT to VL or TM. Unfortunately, it also means that you have just reassigned your DATA Fader to VL or TM and you won't be able to use the DATA Fader feature. We suggest that once you have assigned a fader to function as a DATA Fader, you should move the cursor away from the DAT location before you touch the fader -- so you won't turn the feature off.

Important: The FADER SCREEN: the one exception to using the combination of UP/DOWN LEFT/RIGHT arrow keys to selecting or changing values is in the following screen:

00	00	00	00
00	00	00	00

In this screen, there is no cursor and clicking on any of the arrow buttons will have no effect. However, if you move any of the eight faders, you will notice the values change as you move the fader. Each number represents a change of 832 μ S (micro seconds) or 1 MIDI velocity offset. This screen is for visually verifying the settings of the faders and each fader will change one of the eight sets of digits on this screen.

The GO/SET button:

The GO/SET button is used to execute certain settings or commands to the *Feel Factory*: This function will be described in the "Reference to Screens" section of this manual.

Complete RESET and ERROR CHECKING the Feel Factory :

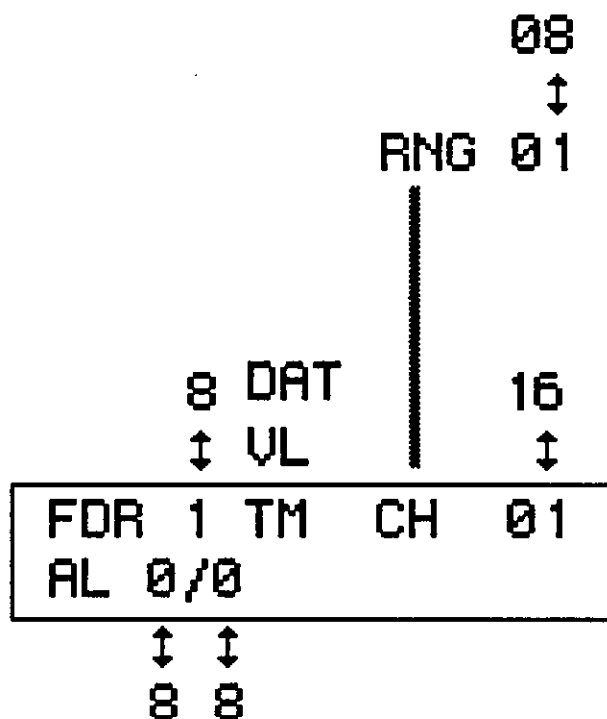
Hold down the MENU button while cycling the power on and off. This will clear all settings in the *Feel Factory's* current memory buffer and reset all screens and values to factory values. This will also test each microprocessor and internal RAM. If a "error" condition exists an "error message" will be displayed on the LCD.

... DANGER ... By holding the MENU BUTTON down and cycling the power, ALL PRESETS WILL BE LOST INCLUDING PRESET #1!! BE CAREFUL OUT THERE, FACTORY WORKERS.

Reading & Setting Screen Parameters:

The following section will give a detailed listing of all *Feel Factory* screens and parameters. In order to represent the screens in this manual, some conventions are employed throughout the rest of this manual.

For example, the following is a representation of the Fader Assignment screen:



The elements shown within the rectangle are the default values of the *Feel Factory*. (You should follow along on the actual unit for clarification.)

Changing Parameters: Any element within the rectangle that has another element immediately above or below it indicates an alternative value. For example the element TM has a corresponding value of VL. Thus if you moved the cursor to TM and then clicked the UP arrow button, the value would then read VL. A subsequent click on the DOWN arrow button will change the value back to TM.

Any element linked to another element immediately above or below it by a double arrow "↕" indicates a range of values. For example, if you moved the cursor to the digits "01" and then clicked on the UP arrow button, with each click the value will increment by a value of 1 until it reaches "16." Clicking on the DOWN arrow button will decrement the value until it reaches "01."

Any element linked to another element by a gray line indicates multiple sets of values are possible. For example, the element CH has an alternate value of RNG. However, the elements following "Ø1" will also change. If CH is selected, then the next set of values has a range of "Ø1 - 16." If RNG is selected, then the following values has a range of "Ø1-8."

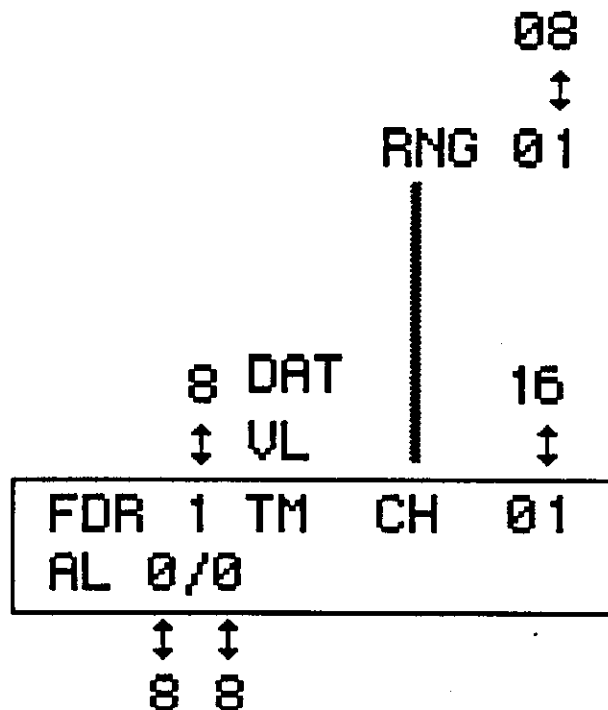
Summary of basic commands:

Changing screens: Hold down MENU button while clicking on either the UP or DOWN arrow buttons.

Moving the cursor: Click on the LEFT arrow button to move the flashing cursor to the left. Click on the RIGHT arrow button to move the cursor towards the right.

Setting parameters: Click on either the UP or DOWN arrow buttons to change the value of a parameter.

The Fader Assignment Screen:



This screen is used to assign the function of each of the eight faders (from left to right on the *Feel Factory*) Each fader can control the Timing (TM) or Velocity (VL) of a single MIDI channel (CNL) or a Range of individual notes (RNG) within a MIDI channel.

FDR 1 – 8: the screen displays the function of each of the eight faders. Changing the fader number will change the screen to show what that fader is programmed to do.

TM, VL, or DAT: TM indicates that the fader is programmed to control TIMING.

VL indicates that the fader is programmed to control VELOCITY.

DAT indicates that the fader chosen is now functioning as a DATA entry fader.

CH 1 – 16: CH indicates which MIDI channel the fader will effect. This is useful when each instrument has its own MIDI channel.

RNG 1 - 8: A way to think of a note range is as a "bucket" that you can place one or many notes into. The fader will then control the time placement or velocity of all the notes in the "bucket". RNG indicates which "bucket" of notes the fader has control over. Controlling a note range is useful when the entire rhythm track is recorded on a single MIDI channel, but you only want to fader to effect changes on individual notes within that MIDI channel. See the "Range Programming Screen" later in this manual on how to place MIDI notes in a particular note range that a fader will control.

The value of the RNG is set separately on the RANGE ASSIGNMENT SCREEN.

AL 0-8 / 0-8: AL indicates the algorithms which are working on the MIDI channel or note range that the fader has been assigned to. There are eight possible algorithms. These algorithms are set up in the ALGORITHM ASSIGNMENT SCREEN.

The use of two digits separated by a "/" is because two algorithms can be applied simultaneously. For example, the first algorithm can be used to affect the timing of a range of notes, while a second algorithm can control the velocity of that range. Thus, by moving the fader you are able to control the timing or velocity of the entire MIDI channel or not range plus certain attributes of the velocity or timing which the algorithms are acting on. The effect is cumulative. This means that if the fader advances a MIDI channel forward in time by 5 milliseconds and at a particular instant an algorithm advances the MIDI channel by 2 milliseconds, the channel will be advanced by a total of 7 milliseconds. This cumulative effect is also true of velocity.

Algorithm 0 is the default assignment and it has no effect on any MIDI signal.

It is valuable to know that even though there are only eight faders, it is possible to control all sixteen MIDI channels and eight note ranges at one time. For example, if you assign fader 1 to control the timing of MIDI channel 7 and set the fader to +7 (moving the MIDI data on channel 7 forward in time by approximately 7 milliseconds), you may re-assign fader 1 to control another MIDI channel or note range and the timing offset controlling MIDI channel 7 will remain in place. Therefore it is possible to control all 16 MIDI channels plus eight note ranges.

The Fader Value Screen:

maximum +63

00	00	00	00
00	00	00	00

minimum -64

Each set of digits represents the value of each fader. From top left to bottom right, the digits represent faders 1 through 8. The maximum value for each fader is +63 and the minimum is -64. This screen is unique since it does not use any of the buttons for programming. Instead, it gives numeric feedback of the physical position of the eight faders. If you move the faders, you will see the values change in real-time.

Each unit represents 832 μ s (microseconds) or approximately 1 ms (millisecond).

A positive number (+8) means the MIDI data that the fader controls is more on top of the beat or earlier in time and a negative number (-8) means more behind the beat or later in time.

When the fader is assigned to control velocity, each fader number represents a positive or negative offset that is added to the MIDI velocity passing through the *Feel Factory*. For example if the fader is set to +5 and a MIDI velocity of 88 comes into the *Feel Factory*, a velocity of 93 will be sent out. Conversely, if the fader is set to -5 and a MIDI velocity of 88 comes in, an velocity of 83 will be output. Remember, only velocities that are on the MIDI channel or in the note range that the fader is assigned to will be affected.

The *Feel Factory* has an "auto-null" feature meaning that wherever the fader happens to be when the unit is powered up or reset will be calibrated as zero. A fader can also be recalibrated (new null point established) by using the "Recalibrate Fader option" found in the Utility Screen section of this manual.

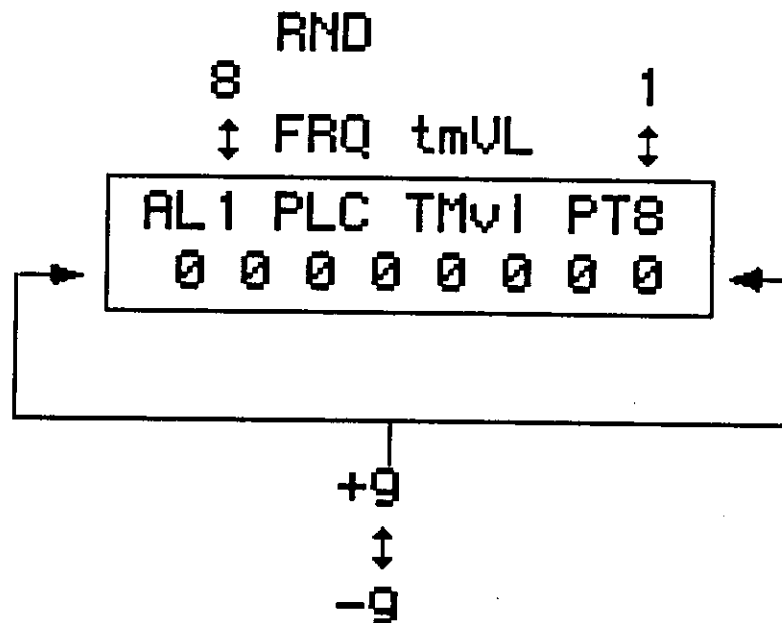
Consequently, if you move a fader towards the bottom of the *Feel Factory* then reset the unit or recalibrate the fader, you will be able to get a greater range of positive values. Or if you move it towards the top, and reset the unit or recalibrate the fader you will get a greater range of negative values.

Exact Timing Reference:

Even though timing references in this manual have been rounded to the nearest millisecond for simplicity's sake, there are those who may need to know the exact nature of the delays contained in the *Feel Factory* . The following formula will suffice:

(DISPLAYED VALUE) X 0.832 = ACTUAL OFFSET VALUE in milliseconds

The Algorithm Programming Screen:



Note: The placement and frequency algorithms will operate only if your sequencer or drum machine is outputting MIDI clocks.

This screen allows you to program the Feel algorithms which are the central core of the *Feel Factory*. You can create up to eight different algorithms, each one affecting the feel in a different way.

Let's look at the basic difference between what a fader does and what an algorithm does. A fader controls a whole instrument. You move a fader up, the bassdrum, for example, goes earlier in time. An algorithm lets you control individual events of that instrument. You can affect the bassdrum only when it falls on the downbeat, for example, or only when the bassdrum part is an eighth note.

What the algorithm does and what the fader does are added together. So you can create an algorithm making the bassdrum 3 milliseconds early on the downbeat. AND move the whole bassdrum earlier by 2 milliseconds via the fader. The net result is that the downbeat would be 5 milliseconds early.

AL 1 - 8: This setting indicates which algorithm is currently displayed by this screen.

PLC, FRQ, RND: These are the three general categories of algorithms: PLaCement, FReQuency, and RaNDomization. Each algorithm controls the how the *Feel Factory* analyzes and breaks down the incoming MIDI data stream. Use of each is determined by what effect you want to impart to the music.

TM, VL: these two settings control how each algorithm affects the selected notes. Upper case indicates that it is turned on, lower case indicates it is turned off.

TM (on) tm (off): this setting controls timing. The effect on selected notes is to move the notes forward or backwards in time in relation to the rest of the sequence.

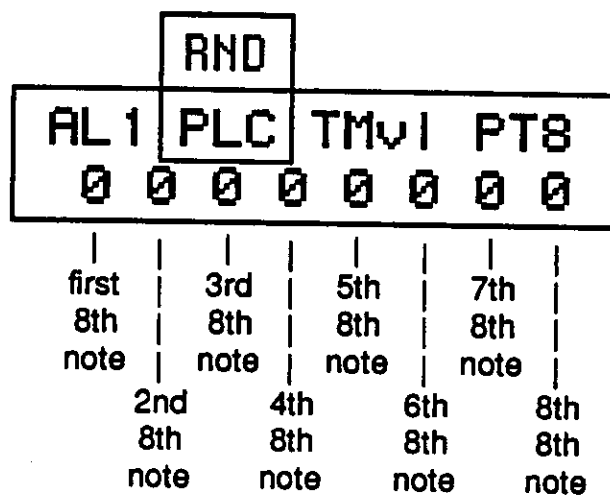
VL (on) vl (off): this setting controls the velocity of selected notes. The effect is to increase or decrease velocity in relation to its original velocity setting.

Both settings can be turned on simultaneously to control both timing and velocity of selected notes.

PT 8-1: this setting controls the number of eighth notes occurring within a pattern for the **PLC (PLACEMENT)** and **RND (RANDOMIZATION)** algorithms.

Ø Ø Ø Ø Ø Ø Ø Ø: These eight numbers (Ø is the default value) at the bottom half of the **ALGORITHM** screen have different meanings depending upon which algorithm type (**PLC, FRQ, RND**) you have selected.

PLACEMENT (PLC): this algorithm acts on different places in a bar of music. The resolution is an eighth note. Therefore, each of the 8 numbers on the bottom half of the algorithm screen represents a different eighth note in the bar. The first number acts on the first eighth note, the second number acts on the second eighth note, and so on.



Beat count: 1 & 2 & 3 & 4 &

For example, a PLACEMENT algorithm of:

AL1	PLC	TMvl	PT8
0	0	0+5	0 0 0 0

means that a MIDI note which falls on the fourth eighth note of the bar will be an additional 5 milliseconds on top of the beat. (Another way of saying it is that the "& of 2" is pushed.)

Note that the TM is upper case and the "vl" is lower case. This means the algorithm is controlling only time. If the algorithm looked like this:

AL1	PLC	tmVL	PT8
0	0	0+5	0 0 0 0

it would mean that the velocity of the MIDI note that falls on the fourth eighth note in the bar would be increased by 5 MIDI velocity units. Note that "tm" is now in lower case and VL is in upper case.

In this screen:

AL1	PLC	TMVL	PT8
0	0	0+5	0 0 0 0

means both the timing and velocity will be affected. The PT value means how many eighth notes are in a measure. For example, if the music is in 3/4 time, there would be six eighth notes in the measure and the PT value would be changed to 6. Sometimes it is a nice effect to make the PT value something other than the time signature. For example, if the song was in 4/4 (PT=8) and you set the *Feel Factory* to PT=6, the effect would be a 3 against 4 nuance.

frequency: this type of algorithm analyzes the incoming MIDI stream and measures the duration of time separating notes. It recognizes spacings between notes in increments of eighth notes up to a whole note. Therefore, the first number in the bottom half of the screen acts on the MIDI notes that have one eighth note separation between them. The second number acts on MIDI notes that have two eighth note separation between them and so on. Therefore:

AL1	FRQ	TMvI	PT8
0	0	0+5	0 0 0 0

means that half-notes, ie. notes that have a separation of four eighth notes will be pushed an additional 5 milliseconds on top of the beat.

randomization: this algorithm works on a first come first serve basis. It simply adds the values at the bottom half of the algorithm screen to the notes in the order that they came in. For example:

AL1	RND	t _m UL	PT8
-1+3-2+5+6	0-4	0	

The first MIDI note to come into the *Feel Factory* would pick up the first offset value (-1) and therefore be approximately 1 millisecond behind the beat. The second MIDI note through would pick up the second value (+3) and be approximately 3 milliseconds on top of the beat and so on. The PTr value in this algorithm dictates where the algorithm loops back on itself. For example, if the pointer was 5 instead of 8, when the 5th value was picked up, the algorithm would reset and -1 would be the next value to be accessed. This prevents any predictability from occurring.